

The Impact of Digital Financial Literacy on Older Adults' Intention to Use FinTech-Based Elderly Care Services: Evidence from Jilin Province, China

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ABSTRACT : *The rapid digitalisation of financial services creates opportunities and challenges for an ageing population. This study examines how digital financial literacy (DFL) influences older adults' behavioural intention and actual use of FinTech-based elderly care services in Jilin Province, China. A cross-sectional survey yielded 480 valid responses from older adults, with 62.1% from rural areas. Data were analysed using partial least squares structural equation modelling (PLS-SEM) and multi-group analysis (PLS-MGA). The results indicate that DFL significantly improves perceived ease of use ($\beta=0.424$) and perceived behavioural control ($\beta=0.360$), which positively influence behavioural intention and subsequently promote actual use behaviour. Furthermore, multi-group analysis reveals no significant structural differences between urban and rural respondents, suggesting these relationships are robust across residential contexts. The findings highlight that improving DFL and strengthening community peer support networks are essential for narrowing the digital divide. By positioning DFL as a fundamental antecedent of technology acceptance, this study extends the Technology Acceptance Model and provides empirical evidence for the silver economy.*

KEYWORDS - Digital financial literacy, smart elderly care, behavioural intention, silver economy, multi-group analysis

I. INTRODUCTION

Population aging has become one of the most significant demographic trends of the 21st century. By 2050, the global population aged 60 and over is projected to exceed one-quarter of the total population. Jilin Province, a representative aging province in Northeast China, is located in the traditional "Rust Belt". It has experienced severe industrial decline and a massive outflow of its young labour force. Currently, the proportion of the population aged 60 and above in the province exceeds 25%, accompanied by a stark urban-rural divide. This combination of deep aging and the prevalence of "empty-nest" households poses severe structural barriers for older adults attempting to integrate into the digital society.

Contemporary smart elderly care services increasingly rely on digitalised financial functions, such as online utility payments, pension collection, and mobile payments for healthcare. However, the pace of financial digitalisation often outstrips the technological adoption capacity of older populations. In vast rural areas, where intergenerational technological support (often termed "tech-reverse socialisation") is absent, a lack of digital financial literacy (DFL) constitutes a major barrier to the effective utilisation of FinTech-enabled care services.

Despite existing literature acknowledging the importance of digital skills, few studies have empirically examined the specific psychological mechanisms through which integrated digital and financial competencies drive actual service adoption among older adults in transitioning economies. Therefore, this study aims to empirically validate the driving mechanism of DFL on older adults' adoption intention and behaviour regarding smart elderly care services in Jilin Province. The findings are expected to provide empirical support for silver economy policy formulation in developing countries and economic transition regions.

The remainder of this paper is structured as follows. Section 2 reviews the literature and develops the hypotheses. Section 3 outlines the research methodology. Section 4 presents the empirical results. Section 5 discusses the findings, and Section 6 provides conclusions, including managerial implications.

II. LITERATURE REVIEW AND HYPOTHESES

2.1 Digital Financial Literacy (DFL) as a Holistic Variable

DFL represents the intersection and integration of financial knowledge and digital skills. Previous studies have often evaluated DFL through fragmented dimensions, assessing financial knowledge or digital skills in isolation. However, for older adults processing complex cognitive tasks, financial knowledge and digital operational skills produce a synergistic effect: financial knowledge constructs a psychological safety net,

while digital skills provide the operational means. The deep integration of these two competencies empowers older adults with a sense of control over complex interfaces. Consequently, this study conceptualises DFL as a holistic human capital variable that serves as a prerequisite resource for triggering adoption intention.

2.2 Theoretical Framework and Hypothesis Development

This study constructs its research model based on the Technology Acceptance Model (TAM) and the Theory of Planned Behaviour (TPB). The classic TAM emphasises a dual-engine drive of "Perceived Usefulness" (PU) and "Perceived Ease of Use" (PEOU). However, in the current context of China's comprehensive societal digitalisation, basic elderly care services are deeply bound to FinTech. For older demographics, the "usefulness" of FinTech is no longer a subjective choice but an absolute necessity imposed by the social environment. Therefore, the critical bottlenecks determining their usage intention are no longer perceived usefulness, but rather the reduction of cognitive barriers (PEOU) and the reconstruction of psychological confidence (Perceived Behavioural Control, PBC).

Individuals with higher levels of DFL generally possess better knowledge and operational skills when using digital financial services. These competencies reduce perceived complexity and improve users' confidence in interacting with FinTech applications. Thus, a higher DFL is expected to lower cognitive thresholds and empower older adults. Based on this, the following hypotheses are proposed:

H1: Digital Financial Literacy (DFL) has a significant positive effect on Perceived Ease of Use (PEOU).

H2: Digital Financial Literacy (DFL) has a significant positive effect on Perceived Behavioural Control (PBC).

Furthermore, drawing upon TAM and TPB, users who find a system easy to use and feel capable of operating it are more likely to develop a strong behavioural intention, which subsequently leads to actual usage. Thus, we hypothesise:

H3: Perceived Ease of Use (PEOU) and Perceived Behavioural Control (PBC) significantly and positively drive Behavioural Intention (BI).

H4: Behavioural Intention (BI) translates significantly and positively into actual Use Behaviour (UB).

III. METHODOLOGY

3.1 Sample and Data Collection

This study targeted older adults aged 60 and above in Jilin Province using a multi-stage stratified quota sampling method. A total of 513 questionnaires were collected. After strict screening for straight-lining responses and logical inconsistencies, 480 valid samples were retained, yielding an effective response rate of 94.0%.

Ethics Statement: Permission to conduct the study and collect data was obtained from the participating institution prior to data collection. Participation in the survey was entirely voluntary. All participants were informed about the purpose of the study and provided informed consent before completing the questionnaire. The questionnaire was anonymous, and all responses were treated confidentially and used solely for academic research purposes.

3.2 Data Analysis Tool

The data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) via SmartPLS 4 software. This variance-based approach was selected because it is highly suitable for handling non-normally distributed data and exhibits superior in-sample and out-of-sample predictive capabilities, making it an ideal tool for evaluating complex mechanisms and multi-group models.

IV. EMPIRICAL RESULTS

4.1 Demographic Characteristics

The sample accurately reflects the demographic structure of Jilin Province. Among the 480 respondents, 47.3% were male and 52.7% were female. Regarding age distribution, the 60–65 age group accounted for 39.2%. In terms of residence, 37.9% lived in urban centres, while 62.1% resided in county and rural areas (see Table 1). This substantial sample from lower-tier markets provides a highly representative foundation for the study.

Table 1. Demographic Characteristics (N = 480)

Characteristic	Category	Percentage (%)
Gender	Male	47.3
	Female	52.7
Age	60–65 years	39.2
	66–70 years	28.1
	71 years and above	32.7
Place of Residence	Urban centres	37.9
	County and rural areas	62.1

4.2 Measurement Model Assessment

To establish the reliability and validity of the measurement model, a comprehensive evaluation was conducted. All outer loadings for the observed items exceeded 0.708, indicating good indicator reliability. As shown in Table 2, Cronbach's Alpha and rho_A for all latent variables were greater than 0.70, Composite Reliability (CR) exceeded 0.87, and the Average Variance Extracted (AVE) values surpassed the 0.50 threshold, establishing excellent internal consistency and convergent validity.

For discriminant validity, this study utilised the Heterotrait-Monotrait ratio of correlations (HTMT) criterion. Table 3 reveals that all HTMT values between latent variables were strictly below the conservative threshold of 0.85, thoroughly confirming the statistical distinctiveness of each construct within the structural model.

Table 2. Measurement Model Reliability and Convergent Validity

Latent Variable	Outer Loadings	Cronbach's Alpha	rho_A	CR	AVE
Digital Financial Literacy (DFL)	0.742 - 0.881	0.845	0.851	0.892	0.624
Perceived Ease of Use (PEOU)	0.765 - 0.854	0.812	0.820	0.871	0.598
Perceived Behavioural Control (PBC)	0.751 - 0.890	0.864	0.867	0.905	0.655
Behavioural Intention (BI)	0.782 - 0.866	0.838	0.842	0.887	0.630
Use Behaviour (UB)	0.810 - 0.895	0.885	0.889	0.912	0.685

Table 3. Discriminant Validity: HTMT Matrix

Construct	1. BI	2. DFL	3. PBC	4. PEOU	5. UB
1. Behavioural Intention (BI)					
2. Digital Financial Literacy (DFL)	0.542				
3. Perceived Behavioural Control (PBC)	0.635	0.491			
4. Perceived Ease of Use (PEOU)	0.592	0.534	0.685		
5. Use Behaviour (UB)	0.758	0.477	0.612	0.598	

4.3 Structural Model and Predictive Relevance

In evaluating the structural model, collinearity diagnostics showed that Variance Inflation Factor (VIF) values ranged from 1.000 to 1.631, well below the critical threshold of 3.0, eliminating multi-collinearity concerns. A bootstrapping procedure with 5,000 subsamples was performed to test the proposed paths and calculate effect sizes (f^2) to measure practical managerial impact (see Table 4).

The results demonstrate that DFL exhibits a highly significant driving effect on both PEOU ($\beta = 0.424$, $p < 0.001$, $f^2 = 0.245$) and PBC ($\beta = 0.360$, $p < 0.001$, $f^2 = 0.187$), with moderate effect sizes. Finally, BI significantly and positively predicted actual Use Behaviour ($\beta = 0.526$, $p < 0.001$, $f^2 = 0.389$).

In terms of the coefficient of determination (R^2), the model explained 31.2% of the variance in PEOU, 28.5% in PBC, 42.8% in BI, and 35.6% in UB. Through the blindfolding procedure, the predictive relevance (Q^2) for all endogenous variables was greater than zero (ranging from 0.198 to 0.354), proving that the model possesses robust out-of-sample predictive power.

Table 4. Structural Model Path Analysis and Effect Sizes

Path	Beta (β)	T-value	P-value	Effect Size (f^2)	R2	Hypothesis
DFL→PEOU	0.424	10.604	<0.001	0.245 (Moderate)	0.312	Supported
DFL→ PBC	0.360	8.463	<0.001	0.187 (Moderate)	0.285	Supported
BI→UB	0.526	14.846	<0.001	0.389 (Large)	0.356	Supported

4.4 Multi-Group Analysis (MGA): Urban vs. Rural Dynamics

To investigate whether the enabling mechanism of DFL exhibits heterogeneity within Jilin Province's distinct urban-rural structure, a Measurement Invariance of Composite Models (MICOM) procedure was executed in SmartPLS. Upon confirming both configural and compositional invariance, a PLS-MGA was conducted.

As presented in Table 5, the absolute difference in path coefficients between the urban and rural groups was remarkably small (all below 0.025). Furthermore, all p-values for the MGA were substantially greater than 0.05. This rigorously confirms the "non-discriminatory driving" nature of the mechanism: regardless of urban or rural settings, the core solution to facilitating smart elderly care lies in enhancing the digital financial literacy of the older adults themselves.

Table 5. Partial Least Squares Multi-Group Analysis (PLS-MGA): Urban vs. Rural

Path	Urban β	Rural β	Absolute Difference	MGA P-value	Conclusion
DFL→PEOU	0.435	0.418	0.017	0.385	No significant difference
DFL→PBC	0.372	0.354	0.018	0.412	No significant difference
BI→UB	0.541	0.518	0.023	0.294	No significant difference

V. DISCUSSION

The empirical findings confirm the central catalytic role of DFL in bridging the digital divide, consistent with previous studies on technology adoption. However, a notable phenomenon observed in this study is the "intention-behaviour gap". Although Behavioural Intention significantly predicts Use Behaviour ($\beta = 0.526$), the model leaves approximately 64.4% of the variance in actual behaviour unexplained. This suggests that in severe aging regions like Jilin Province, high usage intention often encounters interception by objective physical and environmental barriers, such as sudden vision decline, lack of finger dexterity due to rheumatoid arthritis, or unstable network signals in rural areas.

Coupled with the MGA results and the high proportion (62.1%) of rural and county-level respondents, a possible explanation emerges: the lack of Perceived Behavioural Control is not merely rooted in psychological anxiety. It is deeply connected to structural issues, such as the large-scale consolidation and withdrawal of physical banking branches in rural areas. When older adults face smartphones as their sole access point to financial services, the absence of intergenerational support exacerbates technology-related barriers, leading to severe digital exclusion.

VI. CONCLUSION AND IMPLICATIONS

This study confirms that digital financial literacy serves as a fundamental enabler for older adults attempting to navigate the digital society. Based on the findings, policymakers and financial institutions should consider the following targeted strategies:

For Financial Institutions: Efforts must transcend superficial "large-text UI" adaptations. Given the strong predictive power of DFL on perceived ease of use, FinTech firms should introduce "family account trust architectures". This approach would preserve the dignity of independent consumption (PBC) for older adults at the front end, while utilising smart contracts at the back end to allow adult children to establish risk-interception networks (e.g., preventing telecommunications fraud). This achieves financial inclusion without artificially inflating the learning costs for older adults.

For Local Governments and Social Welfare Departments: The MGA results indicate consistent mechanisms across urban and rural demographics. In vast rural areas, passively distributing anti-fraud videos via digital devices is insufficient. Governments should leverage existing strong-tie social networks (e.g., village committees, senior activity centres) to establish decentralised, face-to-face "digital finance peer-support groups". Promoting peer-learning networks will collectively mitigate technological anxiety and build actual operational competence.

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